

## Claims

1. (original) A transition for delivering an electrical signal propagating on a coaxial cable to a substrate, comprising:

an input connector adapter configured to receive and retain a coaxial cable having a central conductor;

a housing that defines a cavity having an axis;

an airline conductor situated substantially parallel to the axis of the cavity and in electrical communication with the central conductor of the coaxial cable, wherein the airline conductor and the cavity are configured to form an airline having an impedance that is substantially the same as an impedance of the coaxial cable; and

an interconnect situated on the substrate and extending into the cavity and electrically connected to the airline conductor.

2. (original) The transition of claim 1, wherein the cavity is cylindrical.

3. (original) The transition of claim 2, wherein the interconnect includes a conductive puck.

4. (original) The transition of claim 1, further comprising an output coaxial adapter configured to receive and retain a coaxial cable.

5. (original) The transition of claim 1, wherein the interconnect includes a conductive puck.

6. (original) The transition of claim 5, wherein the substrate is retained by the housing.

7. (original) An apparatus for delivering an electrical signal from a coaxial cable to a substrate, comprising:

an airline that includes a central conductor;

means for securing the coaxial cable to the central conductor and communicating the electrical signal to the central conductor; and

means for electrically connecting the substrate to the central conductor, situated within the airline.

8. (original) A method delivering an electrical signal to a substrate, comprising:  
configuring an airline to receive the electrical signal, wherein the airline includes a conductor and a cavity, and has a characteristic impedance corresponding to a characteristic impedance of the transmission line on which the electrical signal propagates; and  
contacting an interconnect region on the substrate to the airline conductor.

9. (original) The method of claim 8, wherein the characteristic impedance of the airline is approximately equal to the characteristic impedance of the transmission line.

10. (original) The method of claim 8, wherein the characteristic impedance is about 50 Ohms and the transmission line is a coaxial cable.

11. (original) A method of forming a conductive interconnect on a substrate, comprising;

(a) wire bonding a bond wire to a conductive area of the substrate; and  
(b) removing the bond wire from the conductive area so that an associated bond ball remains.

12. (original) The method of claim 11, further comprising repeating steps (a) and (b) a plurality of times.

13. (original) A conductive puck, comprising a plurality of conductive bond balls.

14-32. (cancelled) .

33. (original) A sampling system, comprising:

a sampling circuit defined on a GaAs substrate, the sampling circuit including (a) a coplanar strip strobe waveguide and a coplanar strip intermediate frequency waveguide that are situated symmetrically about a common axis, wherein the strobe waveguide is situated between the intermediate frequency waveguide and the common axis; (b) a plurality of varactors configured with the strobe waveguide to form a nonlinear transmission line (NLTL); (c) capacitive couplers that connect corresponding conductors of the strobe waveguide and the intermediate frequency waveguide; (d) a signal input that includes a conductive puck; (e) two sampling diodes situated to connect respective conductors of the intermediate frequency waveguide the signal input;

an airline that includes a central conductor in electrical communication with the conductive puck and an input and output connector adapters for connection to corresponding coaxial cables, the airline configured to have an impedance corresponding to an impedance of the coaxial cables;

a local oscillator source that provides an electrical signal to the nonlinear transmission line and, that in combination with the NLTL, produces sampling pulses of opposite polarity;

a signal processor in communication with the intermediate frequency waveguide that receives a signal sample obtained from a signal applied to the airline, wherein the signal sample received from a first conductor of the intermediate frequency waveguide is combined with a strobe sample of a first polarity and the signal sample received from a second conductor of the intermediate frequency waveguide is combined with a strobe sample of a second polarity, opposite the first polarity.